REMARKS

Claims 1-12 are pending and under active consideration. No amendments have been made.

The office rejected claims 1-12 under 35 U.S.C. § 103(a) over Kim (KR 1020000014672) and Maeda (US 6,287,723). Applicants submit the claims would not have been rendered unpatentable over the combination of cited references because the combination does not teach or suggest all the limitations of the claims. Specifically, the cited references do not teach or suggest a dispersant containing a polymer backbone capable of surface-adsorption and a side-chain having non-ionic surfactant properties.

The claimed electrode active material slurry utilizes a binder containing a styrene-butadiene-based polymer resin and a thickener containing a cellulose-based or an acrylate-based resin. When using these components, there is difficulty in dispersing them owing to the difference in the specific gravity of the carbon-based electrode active material and those of the binder and thickener.

In order to solve the above problem, and for the purpose of improving the dispersion properties of the inert carbon-based anode active material and/or carbon-based conductive agent, the feature of the present disclosure is to use a dispersant characterized by containing (a) a polymer backbone capable of physically bonding, i.e., adsorption, to the surface of carbon and (b) a side-chain having surfactant properties required for dispersion, in the same molecule.

Kim describes an electrode manufacturing method for a lithium ion secondary battery. However, as the office notes on page 2 of the office action, Kim does not teach or suggest a dispersant containing a polymer backbone capable of surface-adsorption and a side-chain having non-ionic surfactant properties.

The office relies on Maeda to make up for the above deficiencies of Kim. Maeda describes an alkaline secondary battery. At the outset, applicants note that Maeda utilizes an anode active material such as a hydridable alloy or a cadmium alloy. In contrast, Maeda utilizes a carbon active material. Accordingly, there is no motivation to combine the features of Kim and Maeda because they use distinctly different electrode active materials.

Maeda also describes an anode binder which includes a nonionic polymer produced by emulsion polymerization of a nonionic monomer in the presence of a nonionic surfactant

(abstract). Maeda utilizes this nonionic polymer as a binder. In contrast, the claimed anode active material slurry utilizes a dispersant polymer which is distinct from the nonionic polymer of Maeda.

Specifically, the claimed dispersant is a polymer with a backbone capable of surface-adsorption with a side-chain having non-ionic surfactant properties in one molecule. In contrast, the nonionic polymer of Maeda does not contain a side-chain moiety as claimed.

The office states that:

> "Maeda et al., teach a polymer backbone in the dispersant is polyethylene oxide (col. 2, line 56-67). It teaches the content of the dispersant is no more than 10 wt % based on the total weight of the anode active material slurry (col. 3, lines 17-20). It teaches polymer backbone in the dispersant is polyvinylidene fluoride (PVdF) (col. 7, lines 1-4). It teaches side-chain nonionic surfactant is preferably a polyoxyethylene alkyl ether such as polyoxyethylene lauryl ether, polyoxyethylene cetyl ether, polyoxyethylene stearyl ether or polyoxyethylene oleyl ether; polyoxyethylene alkyl aryl ether…; and the like (col. 2, line 59-67 and col. 3, lines 1-8)."

Applicants note that Maeda describes two types of polymers. The first polymer is a nonionic polymer for use as a binder. The second polymer is a "polymer (X)" which is added as an additional ingredient in the binder. Polymer (X) can include PVdF (see column 6, line 60 to column 7, line 16 of Maeda). Applicants submit the office is confusing these two types of polymers which are used as binders not dispersants.

Maeda utilizes a nonionic surfactant to produce the nonionic polymer. This surfactant is not a side-chain nonionic surfactant as the office alleges. The nonionic surfactant is simply used to stabilizes the emulsion polymerization during the polymerization reaction (see column 3, lines 15-17). This surfactant does not participate in the polymerization reaction and is not incorporated into the nonionic polymer. The surfactant is separated from the nonionic polymer after the polymerization reaction is complete.

Therefore, the nonionic polymer in Maeda does not contain a side-chain having non-ionic surface properties as claimed.

Accordingly, the combination of Kim and Maeda do not teach or suggest all the limitations of the claimed; and therefore, applicants respectfully request the office withdraw the rejection of the claims 1-12 under 35 U.S.C. § 103(a) over Kim and Maeda.

In light of the remarks above, applicants submit the application is in condition for allowance. Favorable reconsideration is respectfully requested.

If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

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